

JAN 06 2006

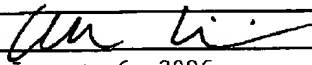
PTO/SB/Z1 (02-04)

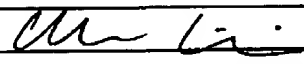
Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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TRANSMITTAL FORM <i>(to be used for all correspondence after initial filing)</i>	Application Number	09/616,457	
	Filing Date	07/14/2000	
	First Named Inventor	Xiao Chen ET AL.	
	Art Unit	2125	
	Examiner Name	Sheela S. Rao	
Total Number of Pages in This Submission	38	Attorney Docket Number	99-464

ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input checked="" type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Documents <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance communication to Technology Center (TC) <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosures(s) (please identify below):
Remarks		
SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT		
Firm or Individual name	Andrew J. Ririe, Registration No. 45,597	
Signature		
Date	January 6, 2006	

CERTIFICATE OF TRANSMISSION		
I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office on this date:		
		01/06/2006
Typed or printed name	Andrew J. Ririe	
Signature		Date 1-6-2006

This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 37 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PTO/SB/17 (05-03)

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**FEE TRANSMITTAL
for FY 2003**

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500

Complete if Known

Application Number 09/616,457
 Filing Date 07/14/2000
 First Named Inventor Xiao Chen ET AL.
 Examiner Name Sheela S. Rao
 Art Unit 2125
 Attorney Docket No. 99-464

METHOD OF PAYMENT (check all that apply)☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None☒ Deposit Account

Deposit

Account Number 03-1129

Deposit

Account

Name

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments☐ Charge any additional fee(s) or any underpayment of fee(s)☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description	Fee Paid
		1001	790	Utility filing fee	
		1002	350	Design filing fee	
		1003	530	Plant filing fee	
		1004	760	Reissue filing fee	
		1005	160	Provisional filing fee	

SUBTOTAL (1) (\$) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Extra Claims Fee from below Fee Paid
 Total Claims ☐ -20** = ☐ X ☐ = ☐
 Independent Claims ☐ -3** = ☐ X ☐ = ☐
 Multiple Dependent Claims ☐ = ☐

Large Entity Small Entity

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description	Fee Paid
		1202	18	Claims in excess of 20	
		1201	88	Independent claims in excess of 3	
		1203	290	Multiple dependent claim, if not paid	
		1204	88	**Reissue independent claims over original patent	
		1205	18	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$) 0

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)**3. ADDITIONAL FEES****Large Entity Small Entity**

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description	Fee Paid
		1051	130	2051 65 Surcharge - late filing fee or oath	
		1052	50	2052 25 Surcharge - late provisional filing fee or cover sheet	
		1053	130	1053 130 Non-English specification	
		1812	2,520	1812 2,520 For filing a request for ex parte reexamination	
		1804	920*	1804 920* Requesting publication of SIR prior to Examiner action	
		1805	1,840*	1805 1,840* Requesting publication of SIR after Examiner action	
		1251	110	1251 110 Extension for reply within first month	
		1252	430	1252 430 Extension for reply within second month	
		1253	980	1253 980 Extension for reply within third month	
		1254	1,530	1254 1,530 Extension for reply within fourth month	
		1255	2,080	1255 2,080 Extension for reply within fifth month	
		1401	340	1401 340 Notice of Appeal	
		1402	340	1402 340 Filing a brief in support of an appeal	500
		1403	300	1403 300 Request for oral hearing	
		1451	1,510	1451 1,510 Petition to institute a public use proceeding	
		1452	110	1452 110 Petition to revive - unavoidable	
		1453	1,370	1453 1,370 Petition to revive - unintentional	
		1501	1,370	1501 1,370 Utility issue fee (or reissue)	
		1502	490	1502 490 Design issue fee	
		1503	660	1503 660 Plant issue fee	
		1460	130	1460 130 Petitions to the Commissioner	
		1807	50	1807 50 Processing fee under 37 CFR 1.17(q)	
		1808	180	1808 180 Submission of Information Disclosure Stmt	
		8021	40	8021 40 Recording each patent assignment per property (times number of properties)	
		1809	790	1809 790 Filing a submission after final rejection (37 CFR 1.129(a))	
		1810	790	1810 790 For each additional invention to be examined (37 CFR 1.129(b))	
		1801	790	1801 790 Request for Continued Examination (RCE)	
		1802	900	1802 900 Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 500

SUBMITTED BY

(Complete if applicable)

Name (Print/Type) Andrew J. Ririe Registration No. (Attorney/Agent) 45,597 Telephone (309) 636-1974
 Signature  Date 01/06/2006

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
)
XIAO CHEN et al.) Art Unit: 2125
)
Application No.: 09/616,457) Examiner: SHEELA S. RAO
)
Filed: July 14, 2000)
)
For: METHOD FOR PROVIDING A)
PROCESS MODEL FOR A MATERIAL IN)
A MANUFACTURING PROCESS)
)
Attorney Docket No.: 99-464)
)

Peoria, Illinois
January 6, 2006

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Alexandria, VA 22313-1450

APPEAL BRIEF

A final Office action was issued on January 14, 2005 ("the Office action"). In response thereto, and in accordance with 37 C.F.R. § 1.191, applicants filed a Notice of Appeal After Final Rejection which was received in the mail room of the U.S. Patent and Trademark Office on June 9, 2005. Following the filing of a Notice of Appeal After Final Rejection, 37 C.F.R. § 1.192(a) requires that an Appeal Brief be filed within two months of the Notice being received by the U.S. Patent and Trademark Office. The two month time period set by 37 C.F.R. § 1.192(a) for filing this Brief is extended by five months until January 9, 2005, by a

simultaneously submitted Petition for Extension of Time Under 37 C.F.R. § 1.136(a). The fee

01/09/2006 EAYALEW1 00000037 031129 09616457

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-2-

for the extension of time should be withdrawn from the undersigned's deposit account no. 03-1129.

1. **REAL PARTY IN INTEREST**

The real party in interest in this appeal is Caterpillar Inc., the assignee of the present patent application. The assignment document assigning all interest in this patent application to Caterpillar Inc. has been duly recorded at the U.S. Patent and Trademark Office.

2. **RELATED APPEALS AND INTERFERENCES**

There are no related appeals nor interferences.

3. **STATUS OF CLAIMS**

Claims 1-16 are pending in the application. Each of claims 1-16 was finally rejected in the Office action of January 14, 2005, for allegedly being obvious under 35 U.S.C. § 103(a).

4. **STATUS OF AMENDMENTS**

There are no pending amendments that have not been entered.

5. **SUMMARY OF INVENTION**

The invention claimed in this patent application involves the modeling or simulation of a manufacturing process to predict the stresses and distortions induced by the

-3-

process. *See* specification, page 5, lines 9-27. It is known to model or simulate certain manufacturing processes, such as welding and thermal cutting, to predict the residual stresses and distortions in the material that the process will cause. *See* specification, page 2, lines 2-6. Modeling or simulation is known as a method for predicting these stresses and distortions, without measuring them directly. One known use for predicting the residual stresses and distortions that will be produced by a manufacturing process is verifying that the process will result in the production of a part where the residual stresses and distortions are within acceptable limits. If the residual stresses and distortions that are predicted by the model or simulation are not within acceptable limits, the process parameters can be modified in an attempt to bring those stresses and distortions within the acceptable limits.

It is proposed in the present disclosure that the accuracy of these models or simulations can be improved. The improvement in accuracy may be obtained by factoring into the model or simulation of a current manufacturing process, the residual stresses and distortions that result from a prior manufacturing process. *See* specification, page 7, lines 29-34, page 8, lines 1-7. The stresses and strains from the current manufacturing process may then be predicted as a function of the current manufacturing process parameters, and the residual stresses and strains in the material from prior processes. *See* specification, page 8, lines 8-34, page 9, lines 1-10. *See also* FIG. 2. The stresses and distortions calculated from the model or simulation of the current manufacturing process may then be provided to models or simulations of subsequent, downstream manufacturing operations. *See* specification, page 9, lines 11-20. *See also* FIG. 2.

-4-

6. **ISSUES**

The single issue presented by this appeal is whether claims 1-16 are unpatentable for allegedly being obvious under 35 U.S.C. § 103(a) in view of U.S. Patent No. 6,061,640 to Tanaka ("the Tanaka patent").

7. **GROUPING OF CLAIMS**

Only for the purpose of resolving the issue for appeal presented herein, applicants declare that claims 1-16 will stand or fall together.

8. **ARGUMENT**

Claims 1-16 stand rejected under 35 U.S.C. § 103(a) for allegedly being obvious in view of the Tanaka patent. This rejection is incorrect because the Tanaka patent does not establish a *prima facie* case that the inventions of these claims are obvious.

Claims 1, 8, and 13 are the independent claims. Each of claims 1, 8, and 13 recites receiving stress and distortion information for a material from a previous manufacturing process, and determining updated stress and distortion information from a process model where the updated stress and distortion information is a function of the stress and distortion information from the previous process and a present process.

The Tanaka patent is directed to using multivariate regression analyses to determine which factors in a manufacturing process contribute to product defects. The Tanaka

-5-

patent does not discuss stress and distortion information, nor using a model or simulation to predict stress and distortion information. In fact, a word search of the text of the Tanaka patent reveals that the words “stress” and “distortion” do not appear anywhere in the text. The Tanaka patent further does not discuss receiving stress and distortion information for a material from a previous manufacturing process, and determining updated stress and distortion information from a process model where the updated stress and distortion information is a function of the information from the previous process and a present process.

The Office Action states that “[a]t col. 3: 11.37, et seq., the prior art of reference discusses the process used for collecting and processing the adverse factor data (information regarding stresses and distortions).” *See* Office action, page 3. Nowhere in the Tanaka reference is adverse factor data described as relating to stresses and distortions. The Tanaka patent discusses a diffusion process for the manufacture of semiconductors, so it is not surprising that stresses and distortions of materials are not mentioned. Thus, it appears that the statement in the Office action, page 3, that the Tanaka reference teaches about stresses and distortions is clearly incorrect.

The Office action further states that “Tanaka teaches that the data to be analyzed is input as parameters into an input unit which is then used by the search unit for analysis. Furthermore, the disclosure by Tanaka states that the analysis is made at several stages so as to define the variables at each stage of analysis.” *See* Office action, pages 3-4. This statement from the Office action does not explain how Tanaka teaches or renders obvious the concept of

-6-

receiving stress and distortion information for a material from a previous manufacturing process, and determining updated stress and distortion information from a process model where the updated stress and distortion information is a function of the information from the previous process and a present process. The stages of analysis discussed in Tanaka refer to stages of analyzing sets of explanation variables, with each stage analyzing the set of explanation variables in a different way so as to finally narrow down to the most important explanation variable which may be causing manufacturing defects. The stages discussed in the Tanaka patent do not at all refer to stages of manufacturing operations, and therefore Tanaka clearly does not disclose or teach stress and distortion data from one stage of a manufacturing operation being fed to a model or simulation of a next stage of a manufacturing process.

Therefore, for all of the proceeding reasons, the Office action has failed to set forth a *prima facie* case of obviousness. The rejection of claims 1-16 under 35 U.S.C. § 103(a) is incorrect and should be withdrawn.

9. **APPENDIX**

An appendix containing a copy of the claims involved in this appeal is attached hereto.

10. **CONCLUSION**

-7-

Any fees required by this Appeal Brief, the accompanying Petition, or as a result of any other requirement at any time during the pendency of this patent application may be withdrawn from the undersigned's deposit account no. 03-1129.

The examiner is encouraged to telephone the undersigned representative for a quick resolution of any outstanding issues to place this application in condition for allowance.

Respectfully submitted,



Andrew J. Ririe
Patent Attorney, Caterpillar Inc.
Registration No. 45,597

Telephone: (309) 636-1974
Facsimile: (309) 675-1236

-8-

APPENDIX
COPY OF CLAIMS UNDER APPEAL

1. (Original) A method for providing a process model for a material in a manufacturing process, including the steps of:

receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the present manufacturing process, the updated stress and distortion information being a function of the stresses and distortions caused by the present manufacturing process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.
2. (Original) A method, as set forth in claim 1, wherein the process model is a thermal process model.
3. (Original) A method, as set forth in claim 2, wherein the stresses and distortions are thermal stresses and distortions.
4. (Original) A method, as set forth in claim 3, wherein the stresses and distortions include changes in dimensions of the material.

-9-

5. (Original) A method, as set forth in claim 3, wherein the stresses and distortions include changes in properties of the material.

6. (Original) A method, as set forth in claim 3, wherein the material is a metal being processed by thermal processes.

7. (Original) A method, as set forth in claim 6, wherein the thermal process is one of a thermal cutting and welding process.

8. (Original) A method for providing a process model for a material in a thermal cutting process, including the steps of:

receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the thermal cutting process, the updated stress and distortion information being a function of the stresses and distortions caused by the thermal cutting process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.

9. (Original) A method, as set forth in claim 8, wherein the material is a metal being cut by the thermal cutting process.

-10-

10. (Original) A method, as set forth in claim 9, wherein the previous manufacturing process is one of a steel rolling process and a shot blasting process.

11. (Original) A method, as set forth in claim 9, wherein the subsequent manufacturing process is one of a bending process and a welding process.

12. (Original) A method, as set forth in claim 8, wherein determining the updated stress and distortion information includes the steps of:

receiving residual stress information from the previous manufacturing process;

mapping deformations of the material from the stress and distortion information received from the previous manufacturing process;

modeling the thermal stresses caused by thermal cutting of the material;

incorporating a set of thermal material laws of the material, the thermal material laws defining properties of the material in a transition state from solid to liquid; and

determining a thermal cutting model of the stresses and distortions of the material as a function of the above steps.

13. (Original) A method for providing a process model for a material in a welding process, including the steps of:

-11-

receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the welding process, the updated stress and distortion information being a function of the stresses and distortions caused by the welding process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.

14. (Original) A method, as set forth in claim 13, wherein the material is a metal being welded by the welding process.

15. (Original) A method, as set forth in claim 14, wherein the previous manufacturing process is one of a thermal cutting process and a bending process.

16. (Original) A method, as set forth in claim 14, wherein the subsequent manufacturing process is a machining process.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
)	
XIAO CHEN et al.)	Art Unit: 2125
)	
Application No.: 09/616,457)	Examiner: SHEELA S. RAO
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Peoria, Illinois
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10. CONCLUSION

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5. (Original) A method, as set forth in claim 3, wherein the stresses and distortions include changes in properties of the material.

6. (Original) A method, as set forth in claim 3, wherein the material is a metal being processed by thermal processes.

7. (Original) A method, as set forth in claim 6, wherein the thermal process is one of a thermal cutting and welding process.

8. (Original) A method for providing a process model for a material in a thermal cutting process, including the steps of:

receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the thermal cutting process, the updated stress and distortion information being a function of the stresses and distortions caused by the thermal cutting process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.

9. (Original) A method, as set forth in claim 8, wherein the material is a metal being cut by the thermal cutting process.

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10. (Original) A method, as set forth in claim 9, wherein the previous manufacturing process is one of a steel rolling process and a shot blasting process.

11. (Original) A method, as set forth in claim 9, wherein the subsequent manufacturing process is one of a bending process and a welding process.

12. (Original) A method, as set forth in claim 8, wherein determining the updated stress and distortion information includes the steps of:

receiving residual stress information from the previous manufacturing process;

mapping deformations of the material from the stress and distortion information received from the previous manufacturing process;

modeling the thermal stresses caused by thermal cutting of the material;

incorporating a set of thermal material laws of the material, the thermal material laws defining properties of the material in a transition state from solid to liquid; and

determining a thermal cutting model of the stresses and distortions of the material as a function of the above steps.

13. (Original) A method for providing a process model for a material in a welding process, including the steps of:

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receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the welding process, the updated stress and distortion information being a function of the stresses and distortions caused by the welding process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.

14. (Original) A method, as set forth in claim 13, wherein the material is a metal being welded by the welding process.

15. (Original) A method, as set forth in claim 14, wherein the previous manufacturing process is one of a thermal cutting process and a bending process.

16. (Original) A method, as set forth in claim 14, wherein the subsequent manufacturing process is a machining process.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
)	
XIAO CHEN et al.)	Art Unit: 2125
)	
Application No.: 09/616,457)	Examiner: SHEELA S. RAO
)	
Filed: July 14, 2000)	
)	
For: METHOD FOR PROVIDING A)	
PROCESS MODEL FOR A MATERIAL IN)	
A MANUFACTURING PROCESS)	
)	
Attorney Docket No.: 99-464)	
_____)	

Peoria, Illinois
January 6, 2006

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APPEAL BRIEF

A final Office action was issued on January 14, 2005 ("the Office action"). In response thereto, and in accordance with 37 C.F.R. § 1.191, applicants filed a Notice of Appeal After Final Rejection which was received in the mail room of the U.S. Patent and Trademark Office on June 9, 2005. Following the filing of a Notice of Appeal After Final Rejection, 37 C.F.R. § 1.192(a) requires that an Appeal Brief be filed within two months of the Notice being received by the U.S. Patent and Trademark Office. The two month time period set by 37 C.F.R. § 1.192(a) for filing this Brief is extended by five months until January 9, 2005, by a simultaneously submitted Petition for Extension of Time Under 37 C.F.R. § 1.136(a). The fee

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for the extension of time should be withdrawn from the undersigned's deposit account no. 03-1129.

1. **REAL PARTY IN INTEREST**

The real party in interest in this appeal is Caterpillar Inc., the assignee of the present patent application. The assignment document assigning all interest in this patent application to Caterpillar Inc. has been duly recorded at the U.S. Patent and Trademark Office.

2. **RELATED APPEALS AND INTERFERENCES**

There are no related appeals nor interferences.

3. **STATUS OF CLAIMS**

Claims 1-16 are pending in the application. Each of claims 1-16 was finally rejected in the Office action of January 14, 2005, for allegedly being obvious under 35 U.S.C. § 103(a).

4. **STATUS OF AMENDMENTS**

There are no pending amendments that have not been entered.

5. **SUMMARY OF INVENTION**

The invention claimed in this patent application involves the modeling or simulation of a manufacturing process to predict the stresses and distortions induced by the

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process. *See* specification, page 5, lines 9-27. It is known to model or simulate certain manufacturing processes, such as welding and thermal cutting, to predict the residual stresses and distortions in the material that the process will cause. *See* specification, page 2, lines 2-6. Modeling or simulation is known as a method for predicting these stresses and distortions, without measuring them directly. One known use for predicting the residual stresses and distortions that will be produced by a manufacturing process is verifying that the process will result in the production of a part where the residual stresses and distortions are within acceptable limits. If the residual stresses and distortions that are predicted by the model or simulation are not within acceptable limits, the process parameters can be modified in an attempt to bring those stresses and distortions within the acceptable limits.

It is proposed in the present disclosure that the accuracy of these models or simulations can be improved. The improvement in accuracy may be obtained by factoring into the model or simulation of a current manufacturing process, the residual stresses and distortions that result from a prior manufacturing process. *See* specification, page 7, lines 29-34, page 8, lines 1-7. The stresses and strains from the current manufacturing process may then be predicted as a function of the current manufacturing process parameters, and the residual stresses and strains in the material from prior processes. *See* specification, page 8, lines 8-34, page 9, lines 1-10. *See also* FIG. 2. The stresses and distortions calculated from the model or simulation of the current manufacturing process may then be provided to models or simulations of subsequent, downstream manufacturing operations. *See* specification, page 9, lines 11-20. *See also* FIG. 2.

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6. **ISSUES**

The single issue presented by this appeal is whether claims 1-16 are unpatentable for allegedly being obvious under 35 U.S.C. § 103(a) in view of U.S. Patent No. 6,061,640 to Tanaka ("the Tanaka patent").

7. **GROUPING OF CLAIMS**

Only for the purpose of resolving the issue for appeal presented herein, applicants declare that claims 1-16 will stand or fall together.

8. **ARGUMENT**

Claims 1-16 stand rejected under 35 U.S.C. § 103(a) for allegedly being obvious in view of the Tanaka patent. This rejection is incorrect because the Tanaka patent does not establish a *prima facie* case that the inventions of these claims are obvious.

Claims 1, 8, and 13 are the independent claims. Each of claims 1, 8, and 13 recites receiving stress and distortion information for a material from a previous manufacturing process, and determining updated stress and distortion information from a process model where the updated stress and distortion information is a function of the stress and distortion information from the previous process and a present process.

The Tanaka patent is directed to using multivariate regression analyses to determine which factors in a manufacturing process contribute to product defects. The Tanaka

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patent does not discuss stress and distortion information, nor using a model or simulation to predict stress and distortion information. In fact, a word search of the text of the Tanaka patent reveals that the words “stress” and “distortion” do not appear anywhere in the text. The Tanaka patent further does not discuss receiving stress and distortion information for a material from a previous manufacturing process, and determining updated stress and distortion information from a process model where the updated stress and distortion information is a function of the information from the previous process and a present process.

The Office Action states that “[a]t col. 3: ll.37, et seq., the prior art of reference discusses the process used for collecting and processing the adverse factor data (information regarding stresses and distortions).” *See* Office action, page 3. Nowhere in the Tanaka reference is adverse factor data described as relating to stresses and distortions. The Tanaka patent discusses a diffusion process for the manufacture of semiconductors, so it is not surprising that stresses and distortions of materials are not mentioned. Thus, it appears that the statement in the Office action, page 3, that the Tanaka reference teaches about stresses and distortions is clearly incorrect.

The Office action further states that “Tanaka teaches that the data to be analyzed is input as parameters into an input unit which is then used by the search unit for analysis. Furthermore, the disclosure by Tanaka states that the analysis is made at several stages so as to define the variables at each stage of analysis.” *See* Office action, pages 3-4. This statement from the Office action does not explain how Tanaka teaches or renders obvious the concept of

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receiving stress and distortion information for a material from a previous manufacturing process, and determining updated stress and distortion information from a process model where the updated stress and distortion information is a function of the information from the previous process and a present process. The stages of analysis discussed in Tanaka refer to stages of analyzing sets of explanation variables, with each stage analyzing the set of explanation variables in a different way so as to finally narrow down to the most important explanation variable which may be causing manufacturing defects. The stages discussed in the Tanaka patent do not at all refer to stages of manufacturing operations, and therefore Tanaka clearly does not disclose or teach stress and distortion data from one stage of a manufacturing operation being fed to a model or simulation of a next stage of a manufacturing process.

Therefore, for all of the proceeding reasons, the Office action has failed to set forth a *prima facie* case of obviousness. The rejection of claims 1-16 under 35 U.S.C. § 103(a) is incorrect and should be withdrawn.

9. APPENDIX

An appendix containing a copy of the claims involved in this appeal is attached hereto.

10. CONCLUSION

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Any fees required by this Appeal Brief, the accompanying Petition, or as a result of any other requirement at any time during the pendency of this patent application may be withdrawn from the undersigned's deposit account no. 03-1129.

The examiner is encouraged to telephone the undersigned representative for a quick resolution of any outstanding issues to place this application in condition for allowance.

Respectfully submitted,



Andrew J. Ririe
Patent Attorney, Caterpillar Inc.
Registration No. 45,597

Telephone: (309) 636-1974
Facsimile: (309) 675-1236

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APPENDIX
COPY OF CLAIMS UNDER APPEAL

1. (Original) A method for providing a process model for a material in a manufacturing process, including the steps of:

receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the present manufacturing process, the updated stress and distortion information being a function of the stresses and distortions caused by the present manufacturing process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.
2. (Original) A method, as set forth in claim 1, wherein the process model is a thermal process model.
3. (Original) A method, as set forth in claim 2, wherein the stresses and distortions are thermal stresses and distortions.
4. (Original) A method, as set forth in claim 3, wherein the stresses and distortions include changes in dimensions of the material.

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5. (Original) A method, as set forth in claim 3, wherein the stresses and distortions include changes in properties of the material.

6. (Original) A method, as set forth in claim 3, wherein the material is a metal being processed by thermal processes.

7. (Original) A method, as set forth in claim 6, wherein the thermal process is one of a thermal cutting and welding process.

8. (Original) A method for providing a process model for a material in a thermal cutting process, including the steps of:

receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the thermal cutting process, the updated stress and distortion information being a function of the stresses and distortions caused by the thermal cutting process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.

9. (Original) A method, as set forth in claim 8, wherein the material is a metal being cut by the thermal cutting process.

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10. (Original) A method, as set forth in claim 9, wherein the previous manufacturing process is one of a steel rolling process and a shot blasting process.

11. (Original) A method, as set forth in claim 9, wherein the subsequent manufacturing process is one of a bending process and a welding process.

12. (Original) A method, as set forth in claim 8, wherein determining the updated stress and distortion information includes the steps of:

receiving residual stress information from the previous manufacturing process;

mapping deformations of the material from the stress and distortion information received from the previous manufacturing process;

modeling the thermal stresses caused by thermal cutting of the material;

incorporating a set of thermal material laws of the material, the thermal material laws defining properties of the material in a transition state from solid to liquid; and

determining a thermal cutting model of the stresses and distortions of the material as a function of the above steps.

13. (Original) A method for providing a process model for a material in a welding process, including the steps of:

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receiving stress and distortion information of the material from a previous manufacturing process;

determining updated stress and distortion information of the material from a process model for the welding process, the updated stress and distortion information being a function of the stresses and distortions caused by the welding process and the stresses and distortions from the previous manufacturing process; and

providing the updated stress and distortion information of the material to a subsequent manufacturing process.

14. (Original) A method, as set forth in claim 13, wherein the material is a metal being welded by the welding process.

15. (Original) A method, as set forth in claim 14, wherein the previous manufacturing process is one of a thermal cutting process and a bending process.

16. (Original) A method, as set forth in claim 14, wherein the subsequent manufacturing process is a machining process.